

Work Order ID 84381

Reprint
84381

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May-30-12 7:41:22 AM

Item ID: D350-748-101 Accept *N900040100* Setup Start *NS1*
 Revision ID: U/R Stop *NS2*
 Item Name: Crosstube Installation, High Fwd
 Start Date: 5/10/12 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 5/25/12 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: *W* Date: Tooling: Date: Run Start *NR1*
 QC: Date: SPC (Y/N): Date: Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-141	F U R <i>OK 9/12/12</i>								<i>12-5-11</i>
100		0.00							
100	DOCUMENT CONTROL								<i>12-5-11</i>
DC	Memo	0.00							
Document Control	Photocopy bluefile & type labels per PPPD350-748-101		CHG002						
110		0.00							
110	BENDING MACHINE - CROSSTUBES								
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT								
120		0.00							
120	QC15- Crosstube Dimensional Check								
QC	Memo	0.00							
Quality Control									

Purch. issue P/O to meter : P/O 16959 C/L 12/06/04

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 Start Date: 5/10/12 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 5/25/12 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
125		0.00							
125									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	***Stress relief*** Heat treat crosstube as per QSI010 4.3 / metcor PD 16954 Temp: _____ SAE AMS 2759 / 1 Rev E Start time: _____ Finish time: _____ METCOR TRAVELER 175926								
127	QC6- Inspect dimensions to drawing	0.00							
127									
QC	Memo	0.00							
Quality Control									

8/2/16

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Item ID: D350-748-101

Accept

N900040100Setup Start ***NS1***

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop ***NS2***

Start Date: 5/10/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

0.00

130

Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube

Batch: *12/5/16*

140

QC5- Inspect part completeness to step on W/O

0.00

140

QC

Quality Control

Memo

0.00

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

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Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

150	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
150	Outsource3	0.00							
Outsource process - Cad plate	Memo Issue P/O: 17084 Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadum Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached								

CL 12/06/04 ①

160	Receive & Inspect for Damage & Mat'l Certs	0.00							
160	Packaging	0.00							
Packaging	Memo Ensure certificate of conformity is attached								

☆ SEE W/O CHG ATTACHED

170	QC5- Inspect part completeness to step on W/O	0.00							
170	QC	0.00							
Quality Control	Memo								

IX
 12-5-15
 Refs/18 @
 4/4/17

NDT

P/O: 17258

CL 12/06/19 X 1

red

277-49

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11.10.05	161	LOAD TUBE TO 3500 ^{lb} FOR 1 MINUTE. REF D.S. EMAIL.		GP 12/6/18	1	GP 12/6/18	
11.10.05	162	NDT TUBE.					

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

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N900040100

Setup Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

NS2

Start Date: 5/10/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	SprayPaint	0.00				1			W 12-06-19
180									
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2								
190	QC14- Inspect Spray Paint	0.00							
190									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches.								
200	Crosstubes	0.00							
200									
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

12-06-25

12-06-24
12-5-16

for Andy

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N900040100

Setup Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

NS2

Start Date: 5/10/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00

210

QC

Memo

0.00

Quality Control

① B 12.06.25

220

Pick Kit

0.00

220

Packaging

Memo

0.00

Packaging

12/6/22

230

QC4- 100% Inspect kits for completeness

0.00

230

QC

Memo

0.00

Quality Control

1 m 12.06.25

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N900040100Setup Start ***NS1***

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Item Name: Crosstube Installation, High Fwd

Stop ***NS2***

Start Date: 5/10/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

240

0.00

240

Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D350-748-101

Location:

PPP Rev: C

12/6/25

250

QC21- Final Inspection - Work Order Release

0.00

250

QC

Memo

0.00

Quality Control

mcs 12/6/25
MF
12-06-25

Picklist Print

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Work Order ID: 84381

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/2012

Required Date: 5/25/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A New Issue 06-07-05 JLM

IPP Rev:B Update qty of MS21042L5 06-09-12 KJ

IPP Rev:C Rev B 07-11-15 DD

IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F 10.08.04 added QSI010

4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225 Insert		Purchased	No			200	Each	920.0000	1	1		12-6-20	

Location Loc Qty Loc Code

ST281	897	
108696	146	
110768	62	
118386	55	
118966	68	
121269	566	
ST282	23	
120410	10	
120451	13	

AN4-41A

Bolt

Purchased No

220 Each 587.0000

8 8

Location Loc Qty Loc Code

360	181	
121185	181	
ST360	406	
115108	3	
115705	7	
117619	27	
118451	50	
118838	50	
119328	100	
120423	150	
121205	15	
121573	4	

Picklist Print

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Work Order ID: 84381

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/2012

Required Date: 5/25/2012

Start Qty: 1.00

Required Qty: 1.00

AN4-6A Purchased No

220 Each 1,830.0000 16 50 16

Bolt

Location Loc Qty Loc Code

355 500

121631 500

ST356 1330

119017 830

~~121243~~ 500

AN5-32A Purchased No

220 Each 288.0000 4 4

Bolt

Location Loc Qty Loc Code

ST339 188

119328 23

119862 50

~~120423~~ 75

120910 30

121415 10

ST340 100

121541 100

AN960JD10 NAS1149D0363J Purchased No

200 Each 0.0000 1 1

Washer

121524

AN960JD416 NAS1149D0463J Purchased No

220 Each 30.0000 32 32

Washer

Location Loc Qty Loc Code

ST351 30

116289 10

119097 20

AN960JD516 NAS1149D0563J Purchased No

220 Each 0.0000 8 8

Washer

1119546

12/6/22

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Shop Packet Print

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Work Order ID: 84381

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/2012

Required Date: 5/25/2012

Start Qty: 1.00

Required Qty: 1.00

D2856-400 Manufactured No
Abrasion Strip

200 f 305.5345 1.181 1.2431579 **AB 12-6-20**

Location	Loc Qty	Loc Code
ST403	216	
81875	216	(1.2)
ST409	89.5345	
63735	0.6696	
68076	0.3149	
71164	8.46	
79551	80.09	

D3500-1 Manufactured No
Saddle

220 Each 99.0000 4 **4** 4

Location	Loc Qty	Loc Code
ST423	14	
78595	14	
ST424	55	
73405	20	
73406	8	4
76000	27	
ST425	30	
76940	30	

D3501-1 Manufactured No
Bushing

220 Each 360.0000

Location	Loc Qty	Loc Code
ST051	360	
67757	4	
70682	82	
73391	6	
74866	207	
77033	61	

16 B85414 12/6/22

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Work Order ID: 84381

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/2012

Required Date: 5/25/2012

Start Qty: 1.00

Required Qty: 1.00

D3502-1	Manufactured	No	200	Each	39.0000	2	2	AS 12-5-16
Support								

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST051	39	
73419	19	
74873	20	

D350-748-141TRN	Manufactured	No	110	Each	2.0000	1	1	
Crosstube Turning Detail								

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	2	
83277	1	
83278	1	

MS21042L4	Purchased	No	220	Each	5,173.0000	24	24	
Nut								

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST300	5173	
119075	241	
121011	1667	
121444	2965	
121652	300	

MS21042L5	Purchased	No	220	Each	1,625.0000	4	4	12/6/2012
Nut								

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
300	500	
121652	500	
ST300	1125	
116105	5	
116548	43	
117611	30	
119109	1047	

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Work Order ID: 84381

Parent Item: D350-748-101

Start Date: 5/10/2012

Required Date: 5/25/2012

Parent Item Name: Crosstube Installation, High Fwd

Start Qty: 1.00

Required Qty: 1.00

MS21920-20 Purchased No

200 Each 116.0000

2

2

AB 12-5-16

Clamp (per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG050

116

116799

8

120676

12

121067

46

121274

50

2

MS27039-1-10

Purchased

No

200

Each

183.0000

1

1

AB 12-5-20

Screw

Location

Loc Qty

Loc Code

GA

100

120449

100

ST291

122027

83

120120

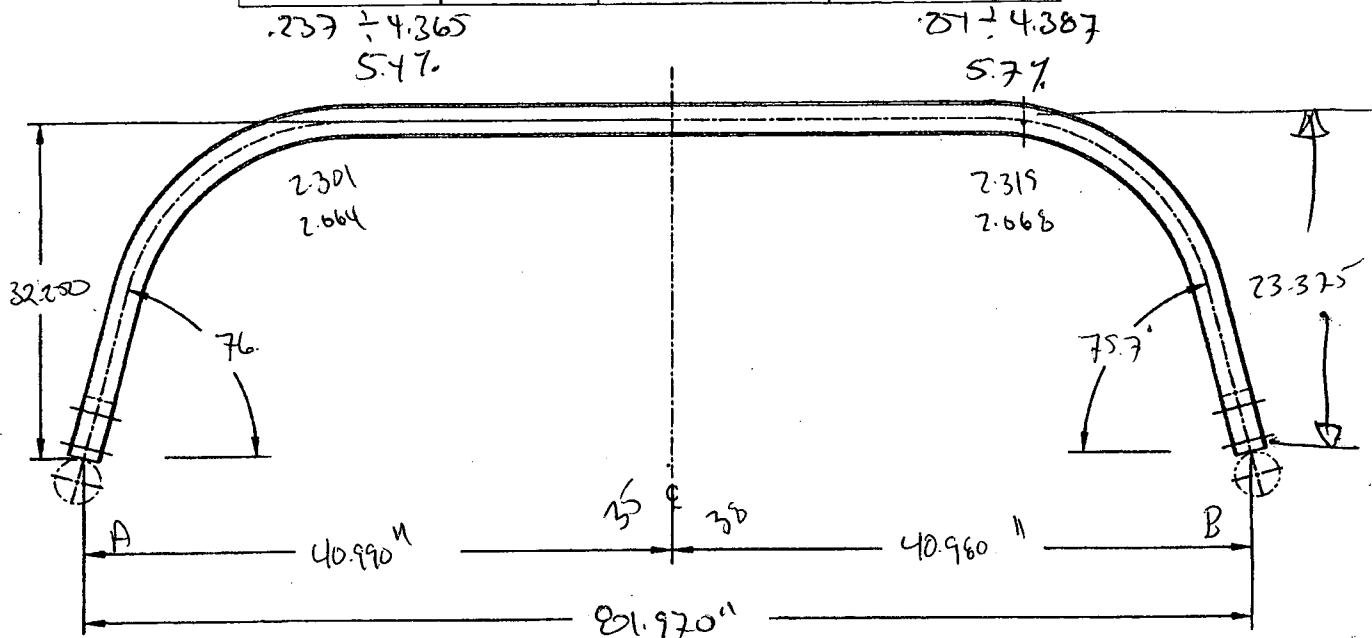
83

1

DART AEROSPACE LTD		Work Order: 81381	
Description: Crosstube High Fwd (AS350/355)		Part Number: D350-748-101	
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1	

3rd

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



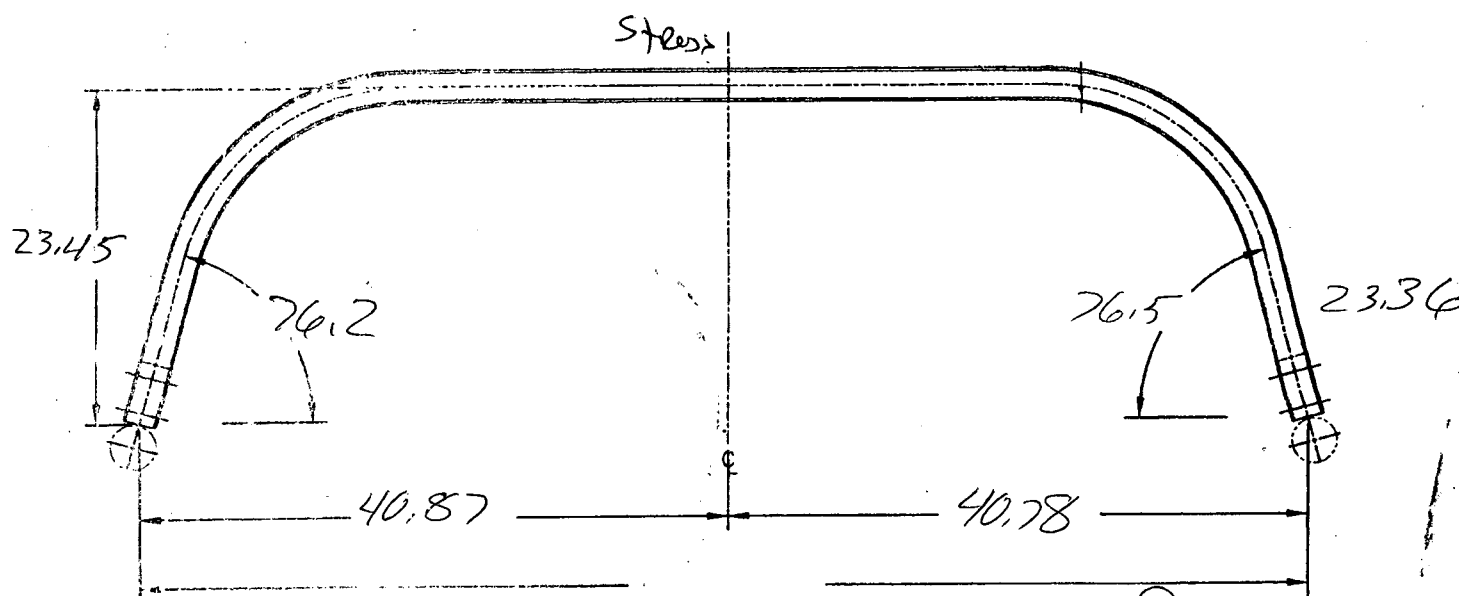
Comments
Side A = 5.47% crush @ 35 PASSES.
Side B = 5.7% crush @ 38 PASSES.
twist = 0.016
OK UP 12-05-11 051042

QC15 Inspection	S
Date	12/05/11

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	

DART AEROSPACE LTD		Work Order:	84381
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04

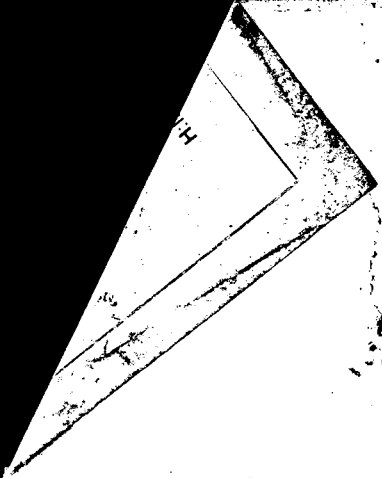


DP 12-5-14

Comments
Twist - 0.036
Acceptable @ 12.05.15 @ SIG 42

QC15 Inspection	S
Date	12/05/16

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	



4

3-

2-

1-

4

3-

2-

1-

4-

3-

2-

1-

A-3

A-2

Side A-1

SIDE B --> .101
--> .113

--> .169
--> .199

SIDE A --> .099
--> .106

--> .165
--> .173

W/O-84381

10 350-748-101

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

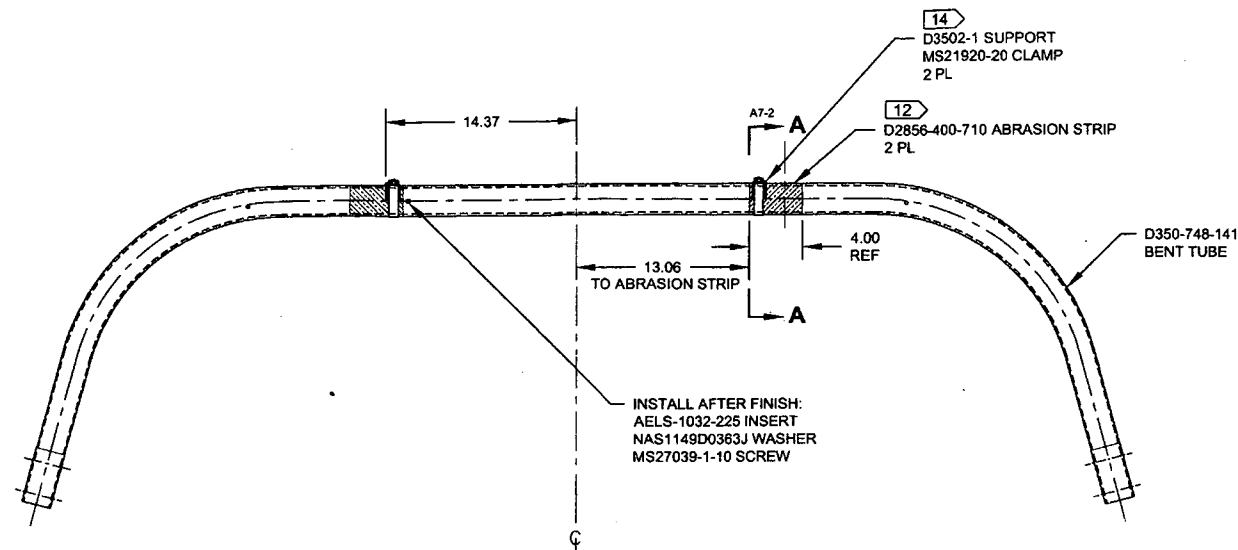
- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

UNDER REVIEW

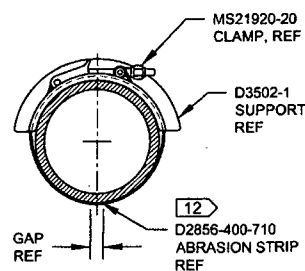
11.07.12

RELEASED
2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	92	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	92		
CHECKED	92	DRAWING NO.	REV. F
MFG. APPR.	92	D350-748-141	SHEET 1 OF 4
APPROVED	92	TITLE	SCALE
DE APPR.	92	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

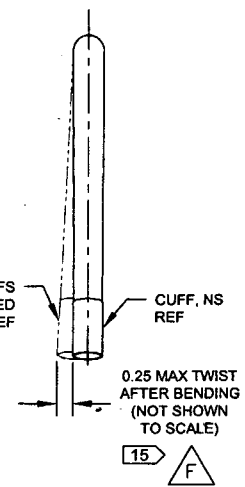
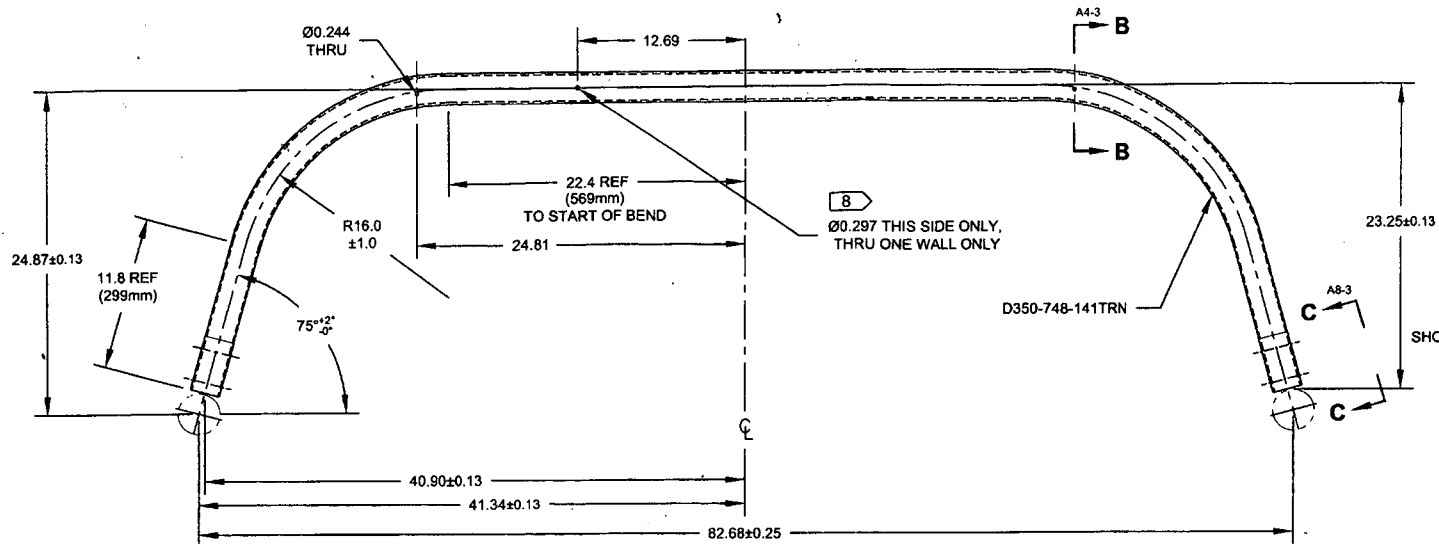
UNDER REVIEW

CP 11.07.11

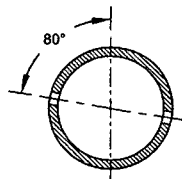
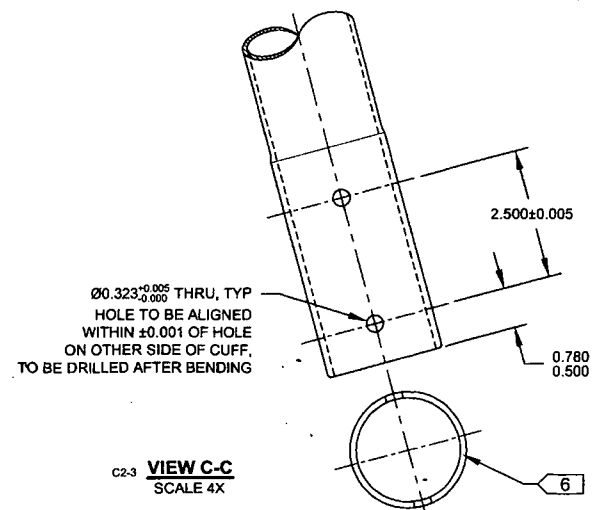
RELEASED
2011-01-19

DESIGN	92	DART AEROSPACE LTD	
DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED	92	DRAWING NO.	REV. F
MFG. APPR.	92	D350-748-141	SHEET 2 OF 4
APPROVED	92	TITLE	SCALE
DE APPR.	92	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2008 BY DART AEROSPACE LTD	
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8 7 6 5 4 3 2 1



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

UNDER REVIEW
11.07.12

RELEASED
2011-01-18
MP

DESIGN	90	DART AEROSPACE LTD	
DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	3	DRAWING NO.	REV. F
MFG. APPR.	2	D350-748-141	SHEET 3 OF 4
APPROVED	1	TITLE	SCALE
DE APPR.	1	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

8 7 6 5 4 3 2 1

METCOR INC.

560 BOUL. ARTHUR-SAUVÉ
ST-EUSTACHE, QC, J7R 5A8

Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité Détaillé

Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

1

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
16954		Steel		
<p style="text-align: center;"><u>SPÉCIFICATIONS DU PROCÉDÉ</u> processing specifications</p> <p>STRESS REL</p> <p>SAE AMS 2759/1 REV.E</p>				
<p><u>EXIGENCE / requirement</u> <u>SPÉCIFICATIONS / specified</u> <u>TESTS EXÉCUTÉS / performed</u> <u>RÉSULTATS DE TESTS / results</u></p> <p>Visual</p>				

METCOR INC.

560 BOUL. ARTHUR-SAUVÉ
ST-EUSTACHE, QC, J7R 5A8

Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité Détaillé

Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K8A 1K7

LIVRÉ A / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K8A 1K7

1

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
7	210	D350-748-101 (1) CROSS TUBE 81519 (1) D350-748-101 CROSS TUBE 83694 (1) D350-748-101 CROSS TUBE 93695 (1) D350-748-101 CROSS TUBE 83696 (1) D350-748-101 CROSS TUBE 83697 (1) D350-748-101 CROSS TUBE 84380 (1) D350-748-101 CROSS TUBE 84381 CONTENANT: 1 PALETTE

Operation	Temp. spécifiée Specified Temp	Temps de trempage Spécifié Specified Soak Temp	Atmosphere	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
1,00 CONT. INIT.	LAVAGE		si nécessaire							
2,00 PREPARING	COMPTAGE									
3,00 STRESS RE	343	2 hrs	air			701				

METCOR INC.
560 BOUL. ARTHUR-SAUVÉ
ST-EUSTACHE, QC, J7R 5A8
Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité Détaillé
Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

1

Operation	Temp. spécifiée Specified Temp	Temps de trempage Spécifié Specified Soak Temp	Atmosphère	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
4,00 FINAL INSP							05-14-2012			05-14-2012

COMMENTAIRES / comments

ALL THE HEAT TREATMENT PROCESSING PERFORMED ON THIS ORDER WAS ACCOMPLISHED USING HEAT TREATMENT EQUIPEMENT THAT MEETS THE REQUIREMENTS OF AMS 2759. ALL THE HEAT TREATMENT OPERATIONS WERE ACCOMPLISHED IN ACCORDANCE WITH THE REQUESTED/REQUIRED HEAT TREATMENT SPECIFICATION AND ALL REQUIRED VERIFICATIONS TEST HAVE BEEN PERFORMED AND DOCUMENTED. NO UNAUTHORIZED CHANGES OR DEVIATIONS TO REQUIRED HEAT TREATMENT SPECIFICATIONS OR PROCEDURES HAVE BEEN PERFORMED.

APPROUVÉ par / Approved by: Steve R. [Signature] MET
16 DATE: 2012-05-17

/ Nous certifions que toute l'information comprise sur ce rapport est exacte et conforme aux requis du client. / We certify that all the information on this report is exact and in accordance with the order requirements.

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-12-2012

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 114965

INVOICE #: 60875

**CONTRACT OR
PURCHASE ORDER #** PO17084

DESCRIPTION: CROSSTUBE

P/N # d350-748-101

S/N # 84381

QTY

1

STRESS RELIEVE HEAT CHART # 12-546. MPI-IAW ASTM-E1444.
CADMIUM PLATE IAW AMS-QQP-416C TYPE 2 YELLOW CLASS.
BAKE HEAT CHART # 12-573. MPI IAW ASTM-E1444.

CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.

Approved Inspector:







LIQUID PENETRANT TEST REPORT

P. 12187

CLIENT	<u>DART AEROSPACE</u>	DATE	<u>JUNE 19/2012</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>MATT / LINDA</u>	ACUREN JOB NO.	<u>188-12-C0765</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN ST.</u>	PO/WO NO.	<u>17084</u>				
	<u>HANKSBURY, ON.</u>	WORK LOCATION	<u>SAME</u>				
PROJECT	<u>F.P.I. ON CROSS TUBES</u>	ACCEPTANCE STD.	<u>ASTM 1417/01-058</u>	REV./DATE	<u>2005</u>		
ITEM(S) EXAMINED	<u>(6 PCS)</u>	<u>SEE RESULTS</u>					

JOB DESCRIPTION	PROCEDURE NO.	LT- <u>0002</u>	REV./DATE	<u>2008</u>	TECHNIQUE NO.	LT- <u>0012</u>	REV./DATE	<u>2008</u>
PART NO.	<u>SEE RESULTS</u>	MATERIAL	<u>4130 STEEL</u>	THICKNESS	<u>VARIOUS</u>			
SPE	<u>+ WET FLUORESCENT LIQUID PENETRANT</u>							
	<u>INSPECTION WAS DONE 100% ON THE EXTERNAL SURFACE ONLY</u>							

TEST DETAILS		<input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE		<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED	
FAMILY BRAND <u>MAGNAFLUX</u>		BLACK LIGHT S/N <u>16459</u>		OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc	
PENETRANT	<u>ZL07</u>	MINIMUM DWELL TIME	<u>45</u> MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	<u>H2O</u>	MINIMUM DRY TIME	> 10 MIN.	OTHER	<u>LAB. NO</u>
DEVELOPER	<u>SKD 52</u>	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	<u>1098866</u>
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY			CAL DUE DATE	<u>JULY 28-2012</u>

TEST SURFACE		<input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input checked="" type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input checked="" type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE		<input type="checkbox"/> < -4°C/20°F <input type="checkbox"/> -4°C/20°F TO 10°C/50°F <input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F <input type="checkbox"/> > 52°C/125°F	

RESULTS-	<input checked="" type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL
<u>W.O. CROSS TUBES</u>	
<u>1</u>	<u>83700</u> ✓
<u>1</u>	<u>83695</u> ✓
<u>1</u>	<u>83694</u> ✓
<u>1</u>	<u>84381</u> ✓
<u>1</u>	<u>81516</u> ✓
<u>1</u>	<u>83299</u> ✓

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR # <u>E-63501</u>	
ENT REPRESENTATIVE	<u>Matthew Murdoch</u>	REPORT	
	PRINT	REVIEWED BY:	
TECHNICIAN SIGNATURE	<u>Mike Lottus</u>	NAME	
	TECHNICIAN	INITIALS	
CGSB LEVEL	<u>II</u> SNT LEVEL	CGSB LEVEL	
CGSB REG. NO.	<u>0606</u>	CGSB REG. NO.	